

The whole subject of trade diseases is in fact too large and too complicated to be handled by a single author, and it cannot be dealt with in generalities. The facts are difficult to come by and hard to interpret, yet it is upon accurate detail alone that preventive measures, involving as they may do such large interests, may with propriety be undertaken. Dr. Oliver has provided a very pleasant introduction to the subject, which should at any rate tend to promote cordial relations with his Continental confreres.

A. E. B.

#### SCIENTIFIC EXPLORATION IN DAHOMEY.

*Mission scientifique au Dahomey.* By Henry Hubert. Pp. iv+568. (Paris: E. Larose, 1908.) Price 15 francs.

IN this work M. Hubert gives a very detailed description of the results of his various journeys in Dahomey, dealing principally with the meteorology, the action of surface waters and of the sea, and the geology. The volume is accompanied by an admirable geological map on the scale of 1:1,250,000, giving the broad structural features of the colony as far as Sansan-Haoussa, on the Niger, in approximately 14° N. lat. It is, of course, idle to expect entirely satisfactory conclusions at a comparatively early stage of investigation, but there is every reason to congratulate M. Hubert on the volume he has produced, on which much time and care have been lavished, and which constitutes a great advance in our knowledge of West African geology. M. Hubert mentions at the outset the characteristics well known to geologists on that coast, of a general simplicity of the main features, a complication in detail and a woeful scarcity of fossils.

As was already known, crystalline rocks occupy by far the greater part of Dahomey, and the coarse granitoid gneisses, banded gneisses, mica- and hornblende-schists, granites and pegmatites do not greatly differ from those of Kamerun and southern Nigeria.

Amongst the less common rock-types described may be mentioned an alkali-granite containing riebeckite, recalling the similar rocks described from Zinder and south of Chad; and some cipolins from the bed of the Zon (Savaloo region), associated at Zompa with a scapolite-hornblende-gneiss. In a somewhat brief account of the petrography these cipolins are described as containing diopside, forsterite and calcite, the first and second occasionally altered into antigorite.

Omitting for a moment the recent beds, M. Hubert finds the continuity of this great stretch of crystalline rocks is broken twice; first by the quartzites of the Atacora ridge, and secondly by the grits of the Gourma. The Atacora range traverses the colony obliquely from Kirtachi, on the Niger, to about the tenth parallel; and is, in M. Hubert's opinion, a prolongation of the northern and southern range, forming the central part of Togo Land, which twists south-westwards to reach the sea at Accra.

Additional information concerning the relations of

the Atacora quartzites to the underlying gneiss and mica-schists would have been welcome, and we may incidentally remark that the word quartzite is used throughout the book for somewhat dissimilar rocks. The Atacora quartzites are probably quartz-schists, and when disturbed (they are generally horizontal) are folded with the underlying rocks. On very slender evidence M. Hubert provisionally maps these rocks as Silurian.

The Gourma grits occupy a tract of country much smaller than, but mapped as essentially parallel to, the Atacora range. The rocks extend from Kodjar to a point more than 100 kilometres south-westwards. These Gourma grits are surrounded by crystalline rocks, noteworthy for the abundance of basic types both amongst the schists and the eruptive series. In regard to age M. Hubert places these grits between the Atacora quartzites and the far more recent beds of the Niger basin, considering them nearer to the former than to the latter.

It is interesting to note the resemblance they bear to the Bandiagara and Hombori beds recorded by M. Desplanges.

Between the Gourma grits and the alluvium, "terre de barre," and other deposits now in process of formation, two areas are noteworthy as containing comparatively recent beds, and as helping towards a reconstruction of West African geography in late Cretaceous and Tertiary times. These are the grits of the Niger basin and the calcareous beds of Lama, which form a narrow strip crossing the colony obliquely to the south of Abomey in 7° N. lat. The ages of these deposits are not definitely fixed; the Niger beds are unfortunately unfossiliferous, and the fossils of the Lama region are not sufficiently characteristic to allow the Eocene age, suggested for them, absolutely to be proved. The identification is based on the occurrence of a *Turritella*, near to *T. eschi*, which in Kamerun is associated with undoubted Eocene fossils, and on the occurrence of *Dactylopora cylindracea*, Lamk. A photograph of a specimen of the shelly limestone and the general habit of the beds recalls the (? Upper) Cretaceous beds of the eastern province of southern Nigeria, and it appears at least possible that future investigation may show the Dahomey rocks to be rather older than was at first believed.

The very interesting question of the age of the Niger grits has to be left entirely open. They form the plateau on either side of the river between Sansan-Haoussa and Gaya, and have been cut through by the Niger, which thus exposes the crystalline rocks beneath. M. Hubert notices these beds as occurring as far south as Sakassi, in northern Nigeria, and somewhat similar rocks occur on the Jebba-Lokoja section of the river. Is it possible that these beds also are of Cretaceous age?

Nearly one-third of the book is devoted to a discussion of the meteorology and the action of superficial waters, while a few short chapters are concerned with the distribution of animal and vegetable types. Distribution of races as determined by geographical conditions greatly interests M. Hubert, and

the all too short notice he gives of the ethnography of the country is concerned with this question. Space only allows of the conclusions at which he arrives being given.

After noting the greater density of the population in the southern part of the colony, a result partly of the forcing seawards of the people by repeated migrations from the north, and partly of the exceptional fertility of the ground; he sums up rather unexpectedly for the remainder of the colony by saying, "tandis que les grandes rivières de l'intérieur font l'office de pôles répulsifs de la population, les montagnes ont été au contraire des pôles attractifs."

The book is essentially one for the geologist, and, if in some places the amount of detail given appears almost too great, we have in M. Hubert's work a most comprehensive and valuable description of an important West Coast colony.

In view of what M. Hubert has been able to do for Dahomey, and Drs. Esch, Solger, and others for Kamerun, it is somewhat dispiriting to find a less keen interest taken by geologists in England in regard to the investigation of the not insignificant British colonies and dependencies.

J. P.

#### THE SOLAR SYSTEM.

*The Solar System. A Study of Recent Observations.*

By Charles Lane Poor. Pp. x+310; illustrated. (London: John Murray, 1908.) Price 6s. net.

IN putting into book form his lectures at the Columbia University, Prof. Poor has rendered a great service to those serious students who, unequipped with a technical vocabulary and a knowledge of mathematics, yet desire to become acquainted with our present-day knowledge of the solar system.

The book is distinctly different from the majority of astronomical text-books in respect to the relative importance attached to the various parts of the subject. Prof. Poor's lectures were evidently intended to supplement the available text-books, and difficult matters, generally given but brief notice, are treated more fully and so clearly that the general reader will find them now well within his limits. This characteristic of the book is noticeable from the beginning, where the author discusses the moon and the alleged variations of lunar features, the earth as an astronomical body, and the tides. The figure and mass of the earth, and their determination, the variation of gravity with latitude, the modifications undergone by the luni-solar tide ere it produces the effects seen round various coasts, and similar subjects are treated comparatively fully.

In the descriptions of the various attempts to measure the solar parallax (chapter iv.), the author refers to the 1900 observations of Eros as likely to afford trustworthy values, but does not appear to have included the preliminary results which have accrued from the Greenwich and Cambridge campaigns.

The chapter on the physical characteristics of the sun is more conventional in its treatment, the history, nature, and changes of sun-spots being discussed at some length. A striking illustration of the variation

with latitude of the solar rotation is provided in the brief description of the relative displacement of land-masses which would follow did the earth but exhibit the same mobility; in a few days from the commencement of a rotation, South America would have displaced South Africa, whilst Sumatra would be directly south of New York. The explanation of the Lockyer-Janssen method of observing solar prominences leads up to the more recent photographic application of the principle in the spectroheliograph, and several of the Yerkes results are reproduced.

The brief descriptions of the instruments and methods whereby the sun's light and heat have been determined are especially clear, and should give every reader a very fair idea of the results achieved by the beautiful researches of Pouillet, Crova, Violle, Langley, and Abbot.

In the succeeding chapters the planets are discussed, first generally, as to their apparent motions, mutual attractions, &c., then *seriatim*. The relative certainty with which their various markings have been established is treated at some length, and some of the conclusions arrived at by Prof. Lowell come in for sharp criticism. But it must here be remarked that that observer has himself stated that the Venus markings are not so hard or regular, or so Martian in their appearance, as they were at first reported to be, whilst many of the theoretical arguments against, and practical negations of, the presence of water vapour in the Martian atmosphere will avail little against the spectroscopic evidence obtained at the Lowell Observatory by Mr. Slipher (see NATURE, No. 2002, March 12, p. 442) since this book was written.

The present-day rapid march of astronomical discovery is further illustrated in the chapter (xii.) on satellite systems, in which the author recounts the discoveries of three new satellites in as many years; yet the tale is incomplete, for, naturally, J viii is not in the list. After a chapter on comets and meteors, the book fittingly concludes with one on the evolution of the solar system, in which the author, after taking a brief historical survey of the various hypotheses, shows how the planetesimal-spiral hypothesis of Chamberlin and Moulton may be held to explain most satisfactorily the many, and sometimes apparently inconsistent, phenomena observed.

The volume is beautifully printed and illustrated, whilst its freedom from slips shows that the author has exercised the same minute care over the proofs that he has in the selection and exposition of the matter.

WILLIAM E. ROLSTON.

#### OUR BOOK SHELF.

*Handbuch der Pharmakognosie.* By Prof. A. Tschirch. Part i. (Leipzig: Chr. Herm. Taubnitz, 1908.) To be completed in about 30 parts at 2 marks (2s.) each.

DURING the past twenty-five years there has been no lack, in Europe or in the United States, of text-books of pharmacognosy, most of which have been designed to meet the requirements of limited circles of students, and have doubtless more or less efficiently served their purpose. But Prof. Tschirch